Appendix E

Land Use Maps
for
Friant and Cross Valley Contract
Service Areas

GIS Land Use Data and Analysis: Sources and Methods

provided by:
Endangered Species Recovery Program, CSU Stanislaus Foundation, Fresno, CA, on behalf of the Bureau of Reclamation.

List of Data Sources

California Department of Water Resource land use data
Abbreviation: DWR
Dates of data: (1993 - 1998)
More information on data at:
http://dplasp.water.ca.gov/landwateruse/landuse/ludataindex.htm
How it was used:
Primary data source

UCSB GAP analysis land cover data
Abbreviation: GAP
Dates of data: (1980 - 1995)
More information on data at:
http://www.biogeog.ucsb.edu/projects/gap/gap_home.html
How it was used:
Used to to further classify non-developed lands of the DWR data and fill in areas outside of DWR surveys

USGS 1:250,000 Land use/land cover data
Abbreviation: LULC
Dates of data: (1977 - 1980)
More information on data at:
http://edcwww.cr.usgs.gov/glis/hyper/guide/1_250_lulc
How it was used:
Urban areas from this coverage where added to DWR data since it included many transportation corridors and industrial (oil) areas not included in the DWR data and to fill in urban values outside of the DWR surveys. The data was also used to further classify urban areas of the DWR, GAP, and FMMP data

California Dept. of Conservation Farmland Mapping and Monitoring Program
Abbreviation: FMMP
Dates of data: (1998)
More information on data at:
http://www.consrv.ca.gov/dlrp/FMMP/
How it was used:
Urban areas from this coverage where added to DWR data to include newer urban uses and fill in land cover values outside of the DWR data survey areas.

U. S. Fish and Wildlife Service National Wetlands Inventory

Abbreviation: NWI
Dates of data: (1998)
More information on data at:
http://www.nwi.fws.gov/
How it was used:
Used to to further classify non developed lands of the DWR data

Dataset Construction

The following steps were taken with each data set:

-Data was obtained for the project area
-Data was mosaiced and dissolved by land use code
-Data was projected to a common map projection
-Land use values where reclassified to USGS land use codes
(see table below)
-Data source and year attributes where added to the data

Land use was assigned in the following steps:

A spatial union was done with the DWR and GAP data to show both the DWR and GAP classification for the entire project area and classified with the following rules:

-Where DWR data was available, the DWR code was assigned
-Where DWR data was not available, the GAP code was assigned
-Where DWR data was the generic "Native Vegetation", the GAP code was assigned if it was an undeveloped category (rangeland, forested land, wetland, or barren). Otherwise, the DWR data retained a code of 30 (unspecified rangeland).

The resulting data set is designated: dwr_gap_i

A spatial union was done with the FMMP and LULC data to show lands classified as urban for the project area and classified with the following rules:

-Where LULC and FMMP were both classified as urban, the LULC code was used since it has more detailed classification codes.
-Where the LULC data was classified as urban and the FMMP data was not, the data was classified using the LULC urban code
-Where the FMMP data was classified as urban and the LULC data was not, the data was classified using the FMMP generic code of 10 (unspecified urban)
-Lands not classified as urban in either set were removed

The resulting data set is designated: lulc_fmmp_urban_i

A spatial union was done with the above data sets (dwr_gap_i and lulc_fmmp_urban_i) to add and enhance urban classifications in the study area, with the following rules:

-Where the DWR data land use code was the generic "Urban" and LULC data was also urban, the LULC code was used to further classify the DWR data.
-Where the LULC data was classified as urban and the DWR data was not, the data was classified using the LULC urban code
-Where the FMMP data was classified as urban and the DWR data was not, the data was classified using the FMMP generic code of 10 (unspecified urban)

The resulting data set is designated: dwr_plus_urban

A spatial union was done with the above data set and the NWI data to enhance wetland classification in the study area, with the following rules:

-Where the dwr_plus_urban data was a non-developed category (not urban or farmland) and the NWI data was for a wetland, the NWI code was used to further classify wetland areas.

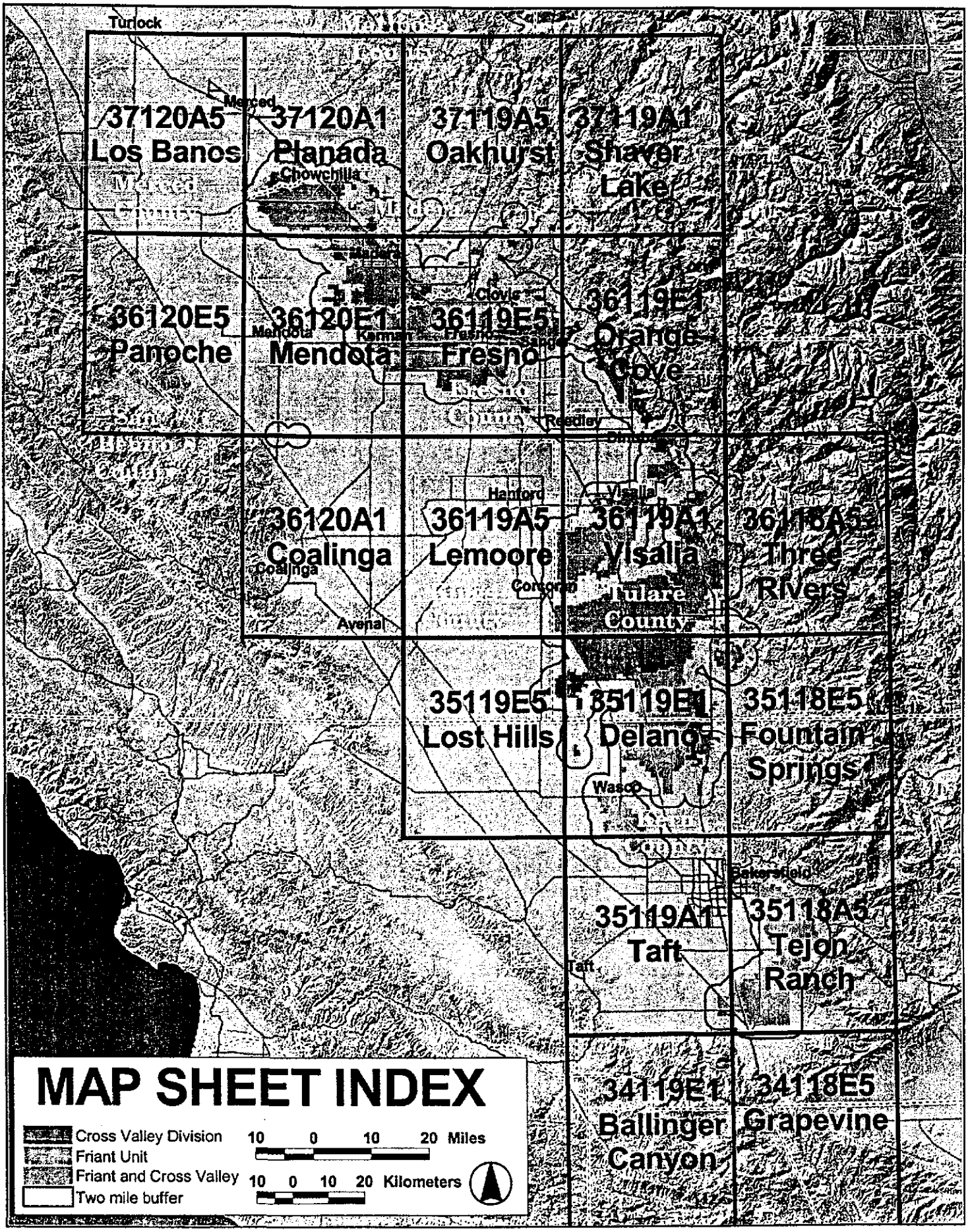
USGS Land use and land cover classification system for use with remote sensor data (Anderson, et al., 1976)

Level I	Level II
1. Urban or Built-up Land	1. Residential 2. Commercial and Services 3. Industrial 4. Transportation, Communications and Utilities 5. Industrial and Commercial Complexes 6. Mixed Urban or Built-up Land 7. Other Built-up Land
2. Agricultural Land	1. Cropland and Pasture 2. Orchards, Groves, Vineyards, Nurseries and Ornamental Horticultural areas 3. Confined Feeding Operations 4. Other Agricultural Land
3. Rangeland	1. Herbaceous Rangeland 2. Shrub and Brush Rangeland 3. Mixed Rangeland

4. Forest Land	1. Deciduous Forest Land 2. Evergreen Forest Land 3. Mixed Forest Land
5. Water	1. Streams and Canals 2. Lakes 3. Reservoirs 4. Bays and Estuaries
6. Wetland	1. Forested Wetlands 2. Nonforested Wetlands
7. Barren Land	1. Dry Salt Flats 2. Beaches 3. Sandy Areas other than Beaches 4. Bare Exposed Rock 5. Strip Mines, Quarries, and Gravel Pits 6. Transitional Areas 7. Mixed Barren Land
8. Tundra	(outside of species' ranges)
9. Perennial Snow or Ice	(outside of species' ranges)

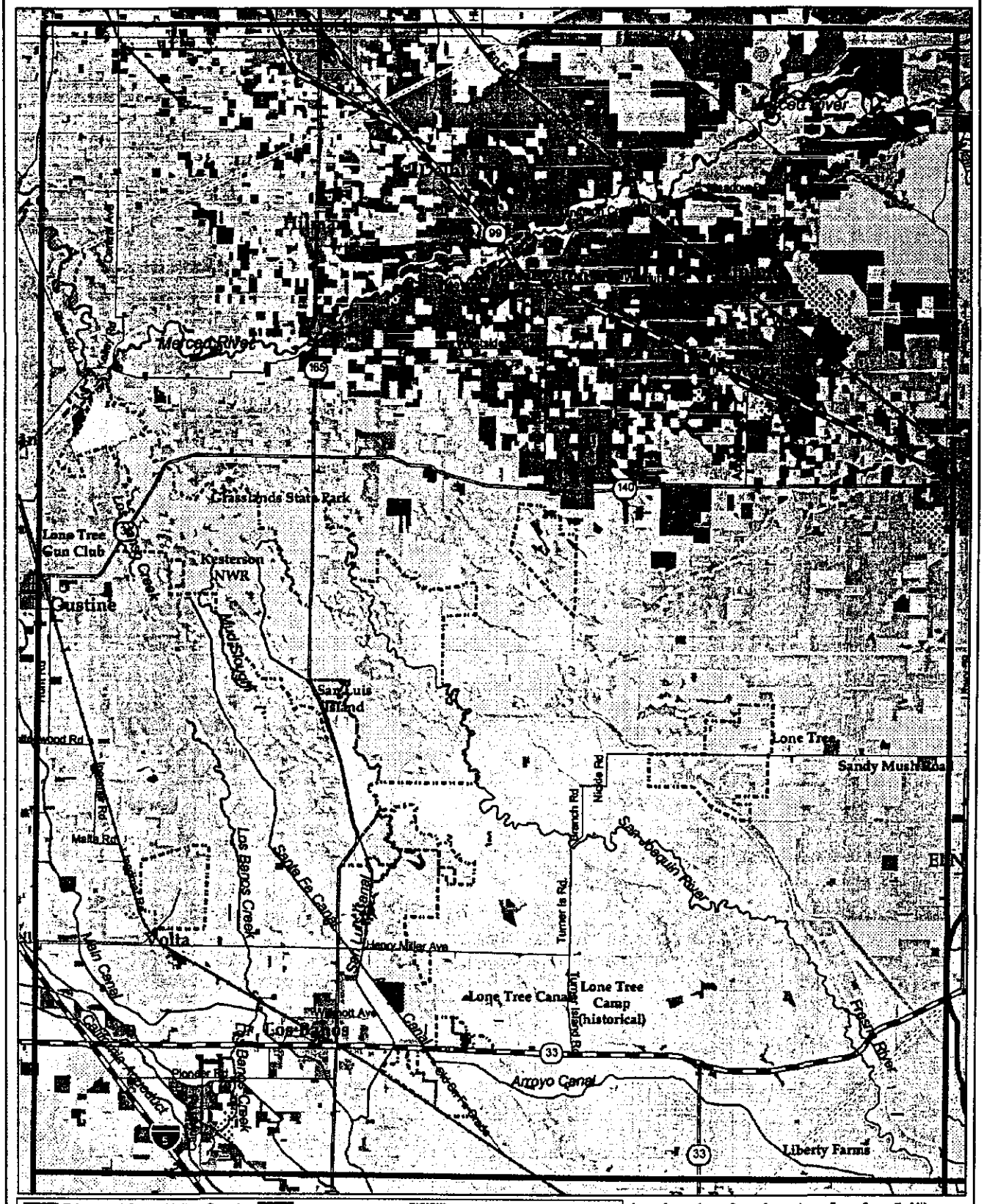
References

Anderson, J. R., Hardy, E. E., Roach, J. T. and Witmer, R. E. 1976. "A Land Use and Land Cover Classification System for Use with Remote Sensor Data." U.S. Geological Survey, Professional Paper 964, p. 28, Reston, VA.


Turlock
Merced
37120A5
Los Banos
37120A1
Planada
Chowchilla
37119A5
Oakhurst
37119A1
Shaver Lake
36120E5
Panoche
36120E1
Mendota
Madera
Kerman
Fresno
Clovis
Sanger
36119E5
Fresno
36119E1
Orange Cove
Reedley
Hanford
36120A1
Coalinga
Coalinga
Avenal
36119A5
Lemoore
Visalia
Tulare
County
36119A1
Visalia
36118A5
Three Rivers
Corcoran
35119E5
Lost Hills
35119E1
Delano
Wasco
35118E5
Fountain Springs
Bakersfield
35119A1
Taft
Taft
35118A5
Tejon Ranch
34119E1
Ballinger Canyon
34118E5
Grapevine
MAP SHEET INDEX
Cross Valley Division
Friant Unit
Friant and Cross Valley
Two mile buffer
10 0 10 20 Miles
10 0 10 20 Kilometers

Los Banos

37120A5



Friant and Cross Valley Canal water districts boundaries

Two mile buffer

Public and conservation land boundaries

Land use/land cover

- Industrial/transp.
- Urban
- Mixed urban
- Barren
- Cropland and pasture
- Orchards and vinyards
- Confined feeding operations
- Idle land
- Water
- Grassland/unknown rangeland
- Shrub and brush/mixed rangeland
- Deciduous forest
- Evergreen forest
- Wetland

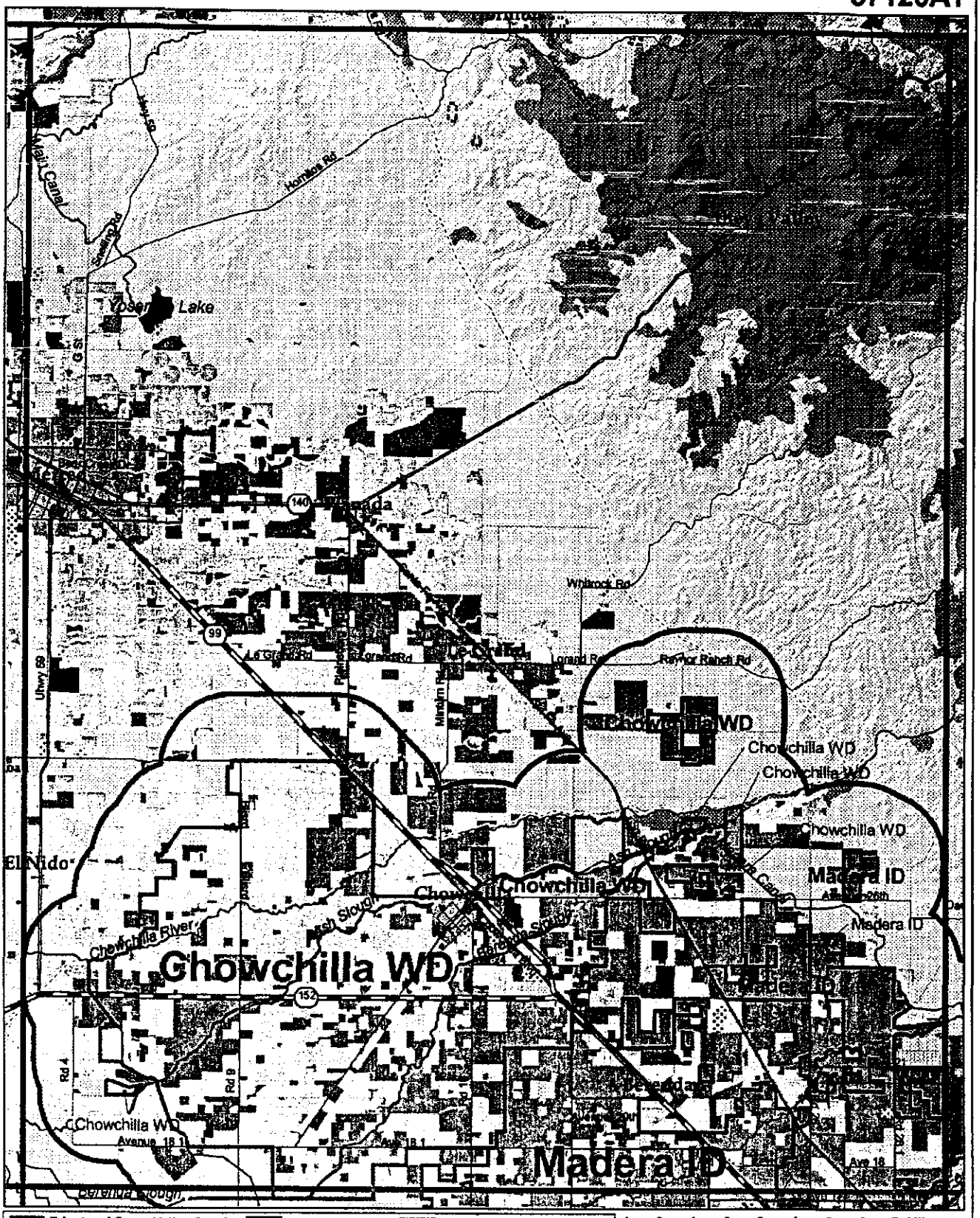
1 0 1 2 3 4 5 6 7 Miles

1 0 1 2 3 4 5 6 7 8 9 Kilometers

1:250 000 30 Minute Series
CSUS/ESRP GIS 01-2001

Planada

37120A1



Friant and Cross Valley Canal water districts boundaries

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1 0 1 2 3 4 5 6 7 Miles

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1:250 000 30 Minute Series

CSUS/ESRP GIS 01-2001

Oakhurst

37119A5

Shaver Lake

37119A1

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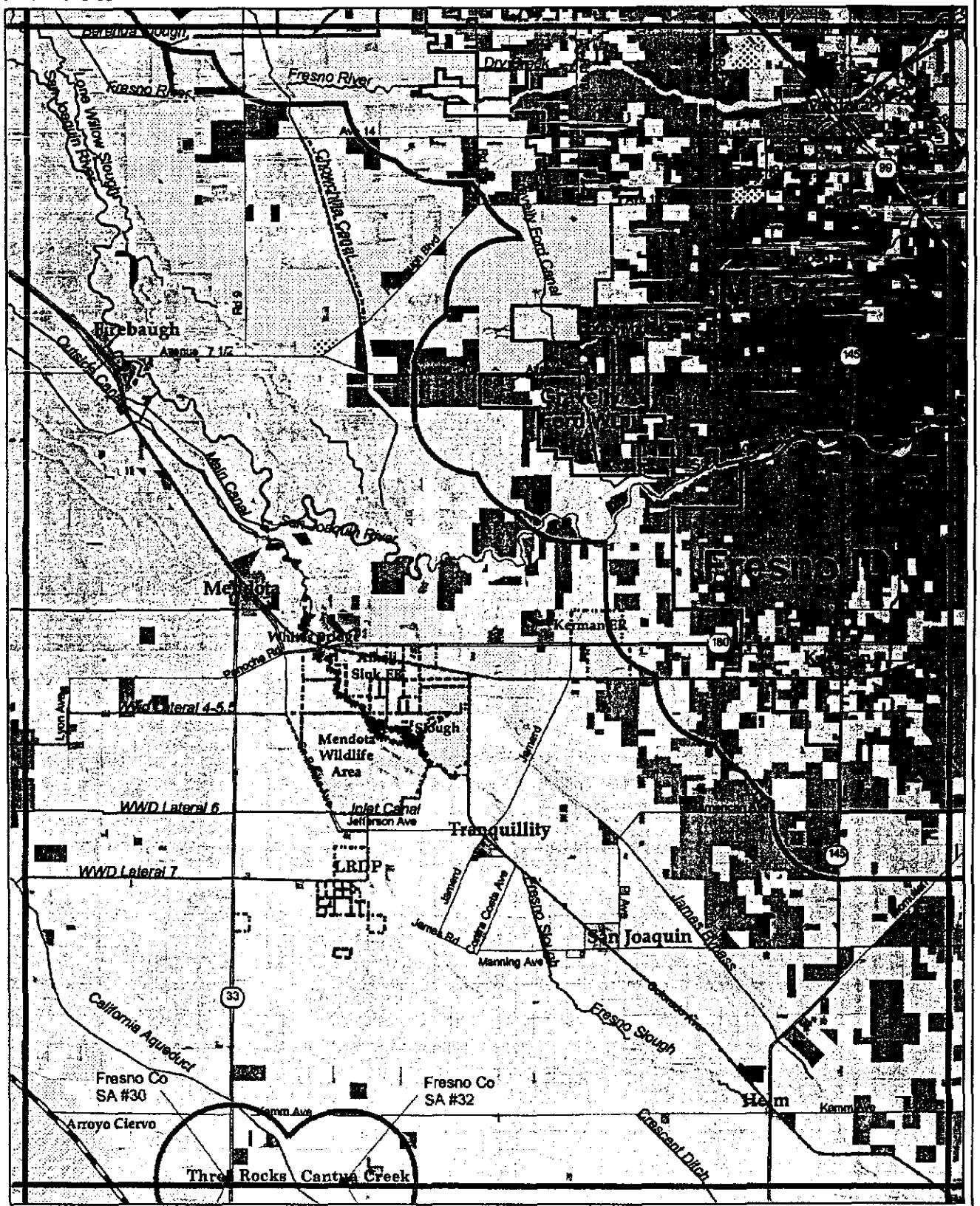
1:250 000 30 Minute Series
CSUS/ESRP GIS 01-2001

Mendota

36120E1



Friant and Cross Valley Canal water districts boundaries

Two mile buffer

Public and conservation land boundaries

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CSUS/ESRP GIS 01-2001

Fresno

36119E5

Friant and Cross Valley Canal water districts boundaries

Two mile buffer

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1:250 000 30 Minute Series

CSUS/ESRP GIS 01-2001

Orange Cove

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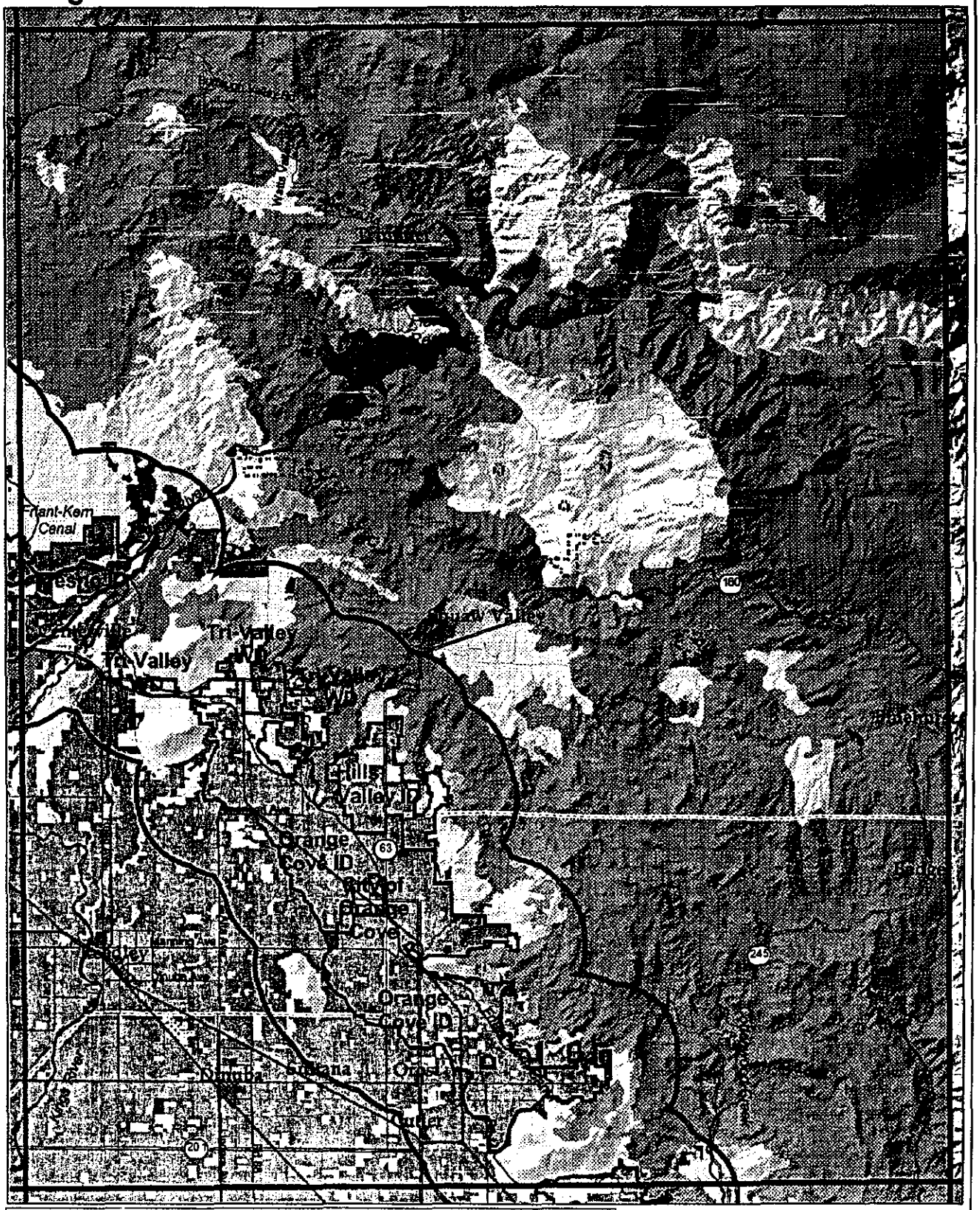

Friant and Cross Valley Canal water districts boundaries

Two mile buffer

Public and conservation land boundaries

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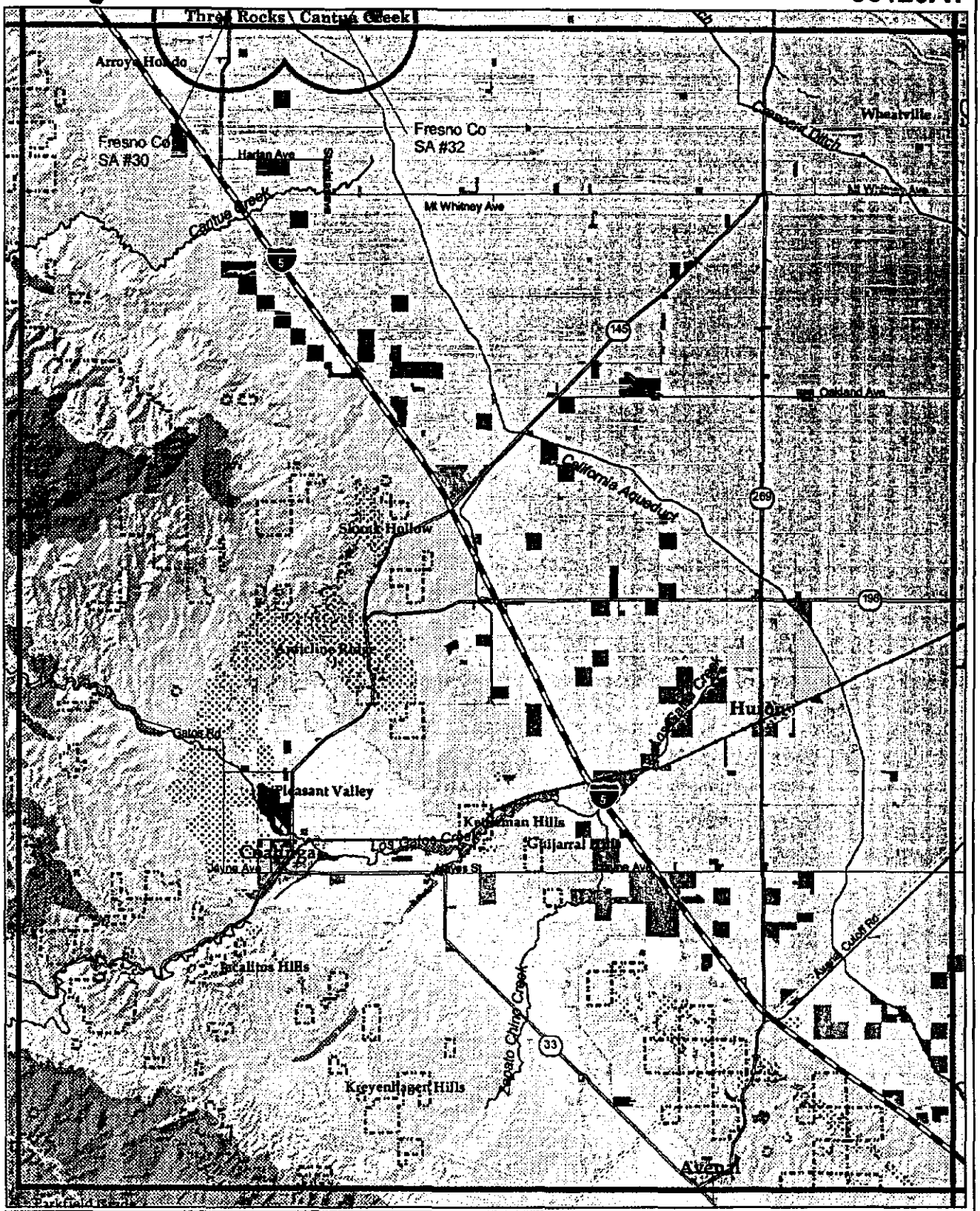
1:250 000 30 Minute Series
CSUS/ESRP GIS 01-2001

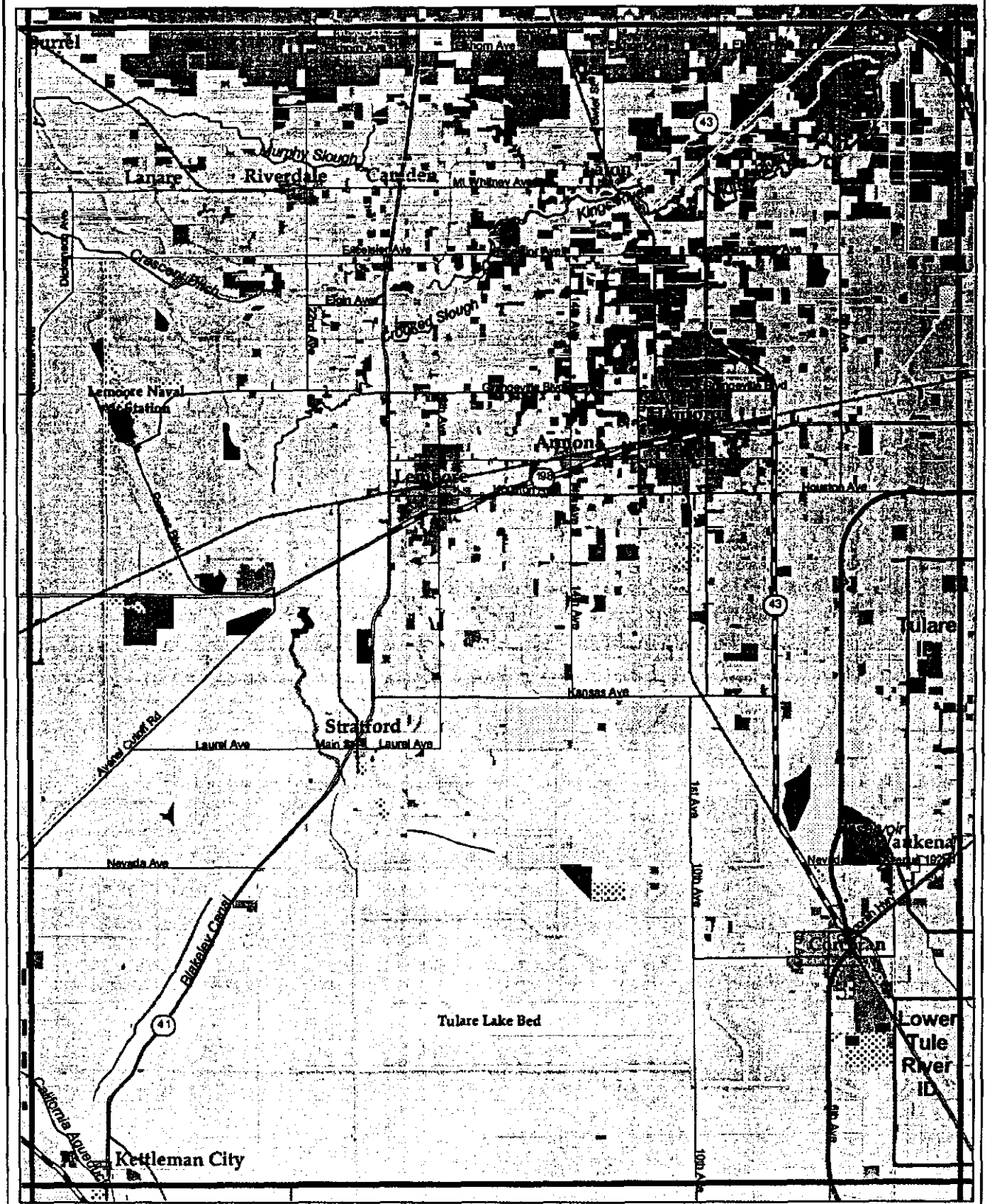
Coalinga

36120A1



Lemoore

36119A5



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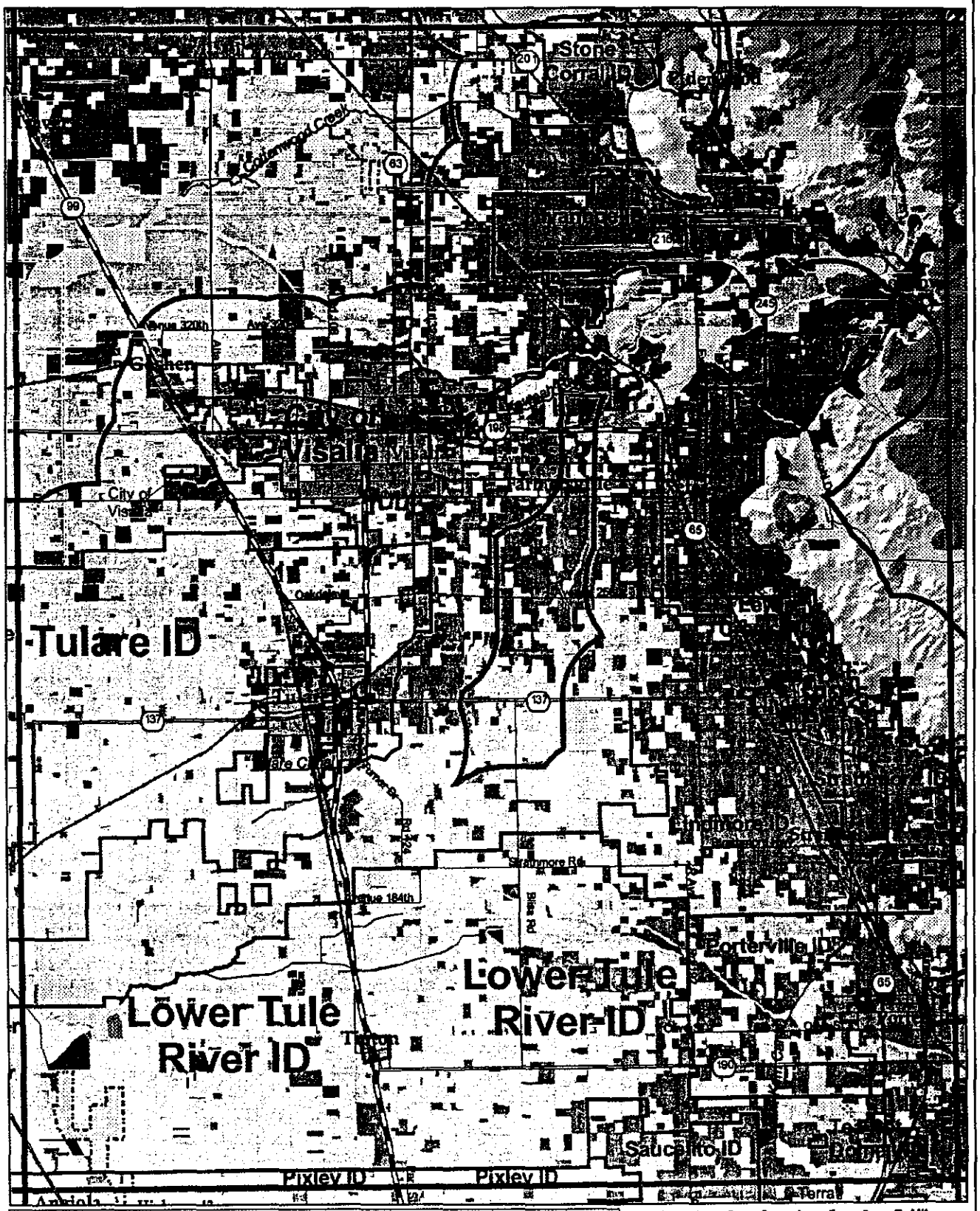
CSUS/ESRP GIS 01-2001

Visalia

36119A1



Three Rivers

36118A5

Friant and Cross Valley Canal water districts boundaries

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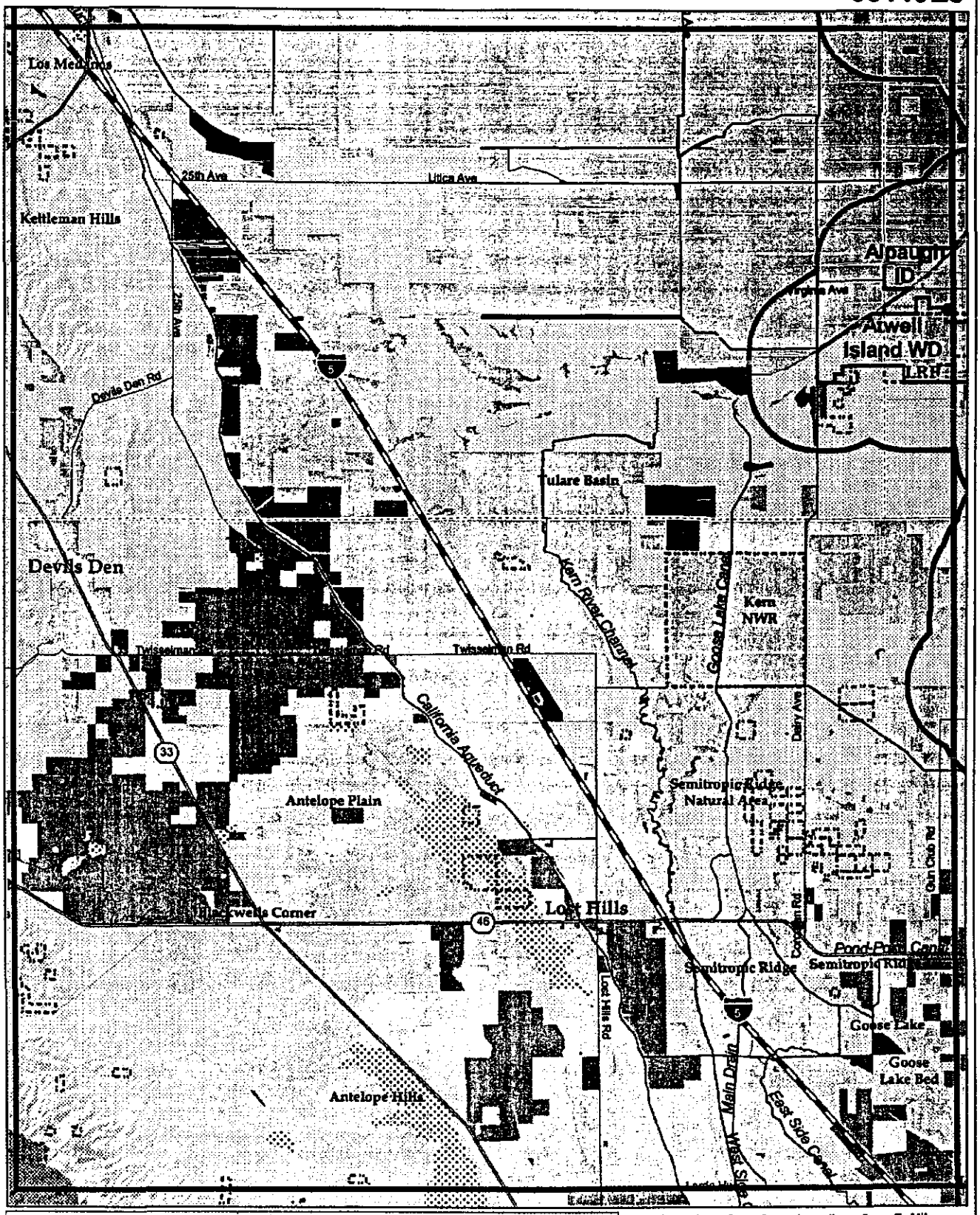
1:250 000 30 Minute Series
CSUS/ESRP GIS 01-2001

Lost Hills

35119E5



Friant and Cross Valley Canal water districts boundaries

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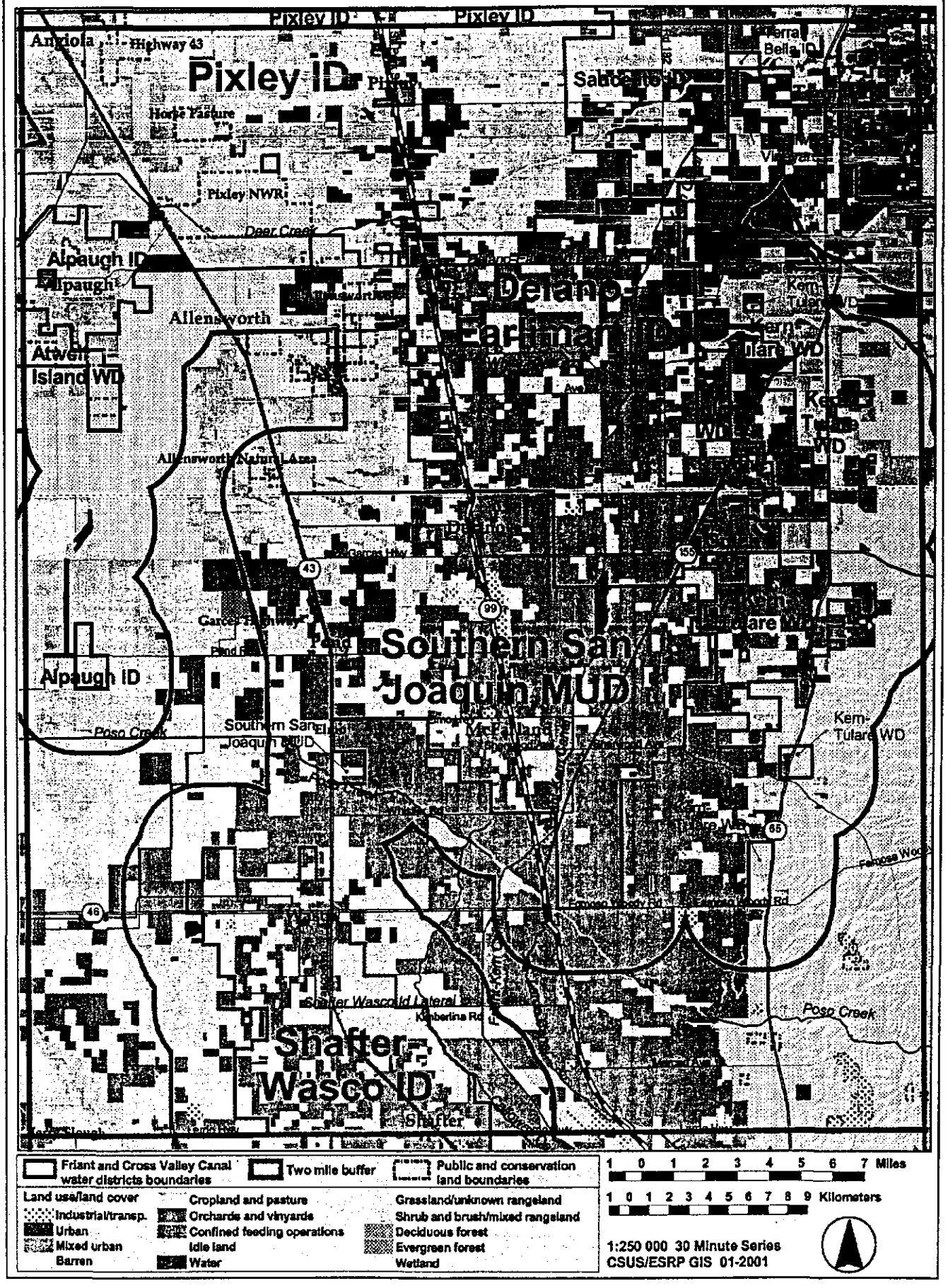
CSUS/ESRP GIS 01-2001

Delano

35119E1



Fountain Springs

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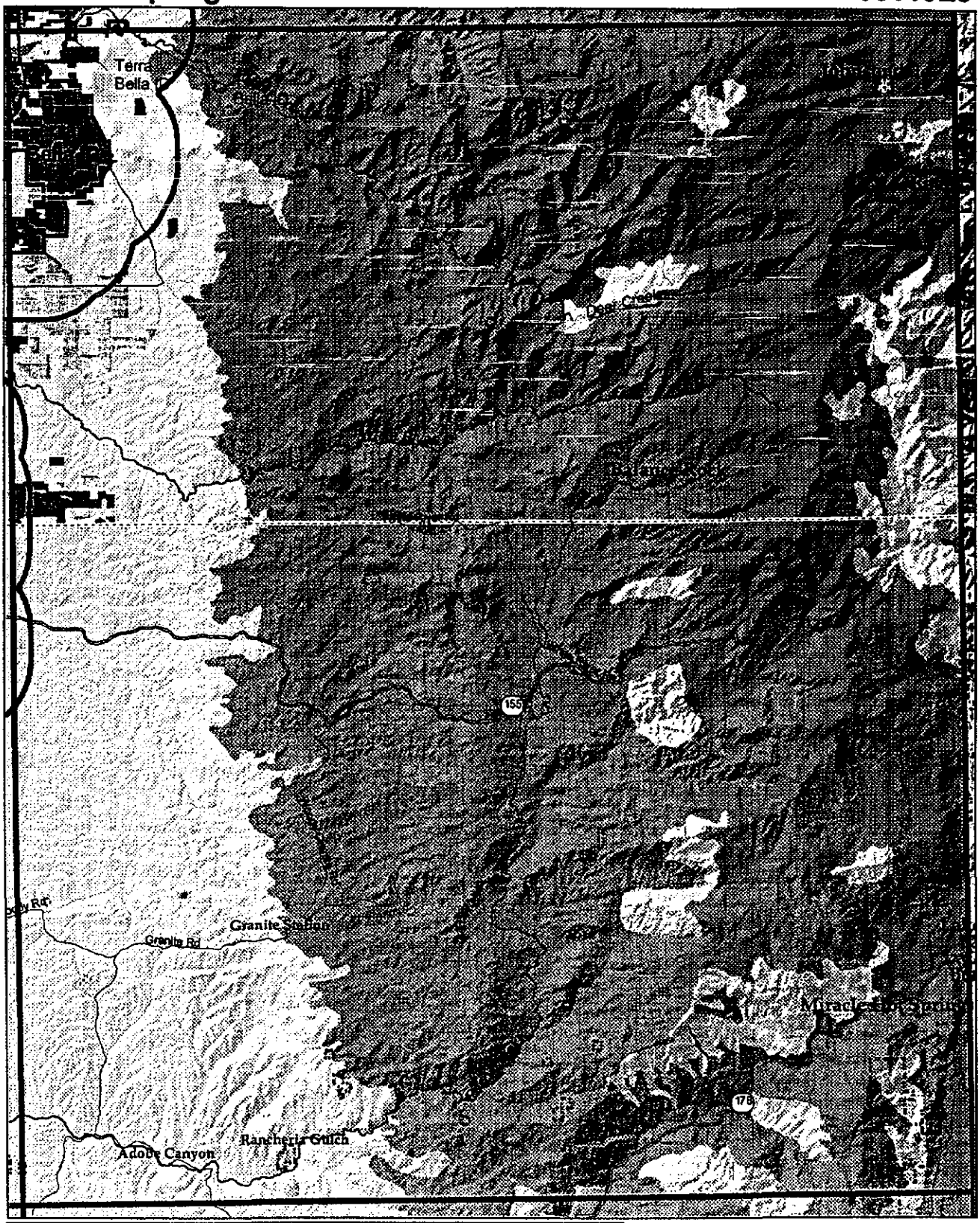

Friant and Cross Valley Canal water districts boundaries

Two mile buffer

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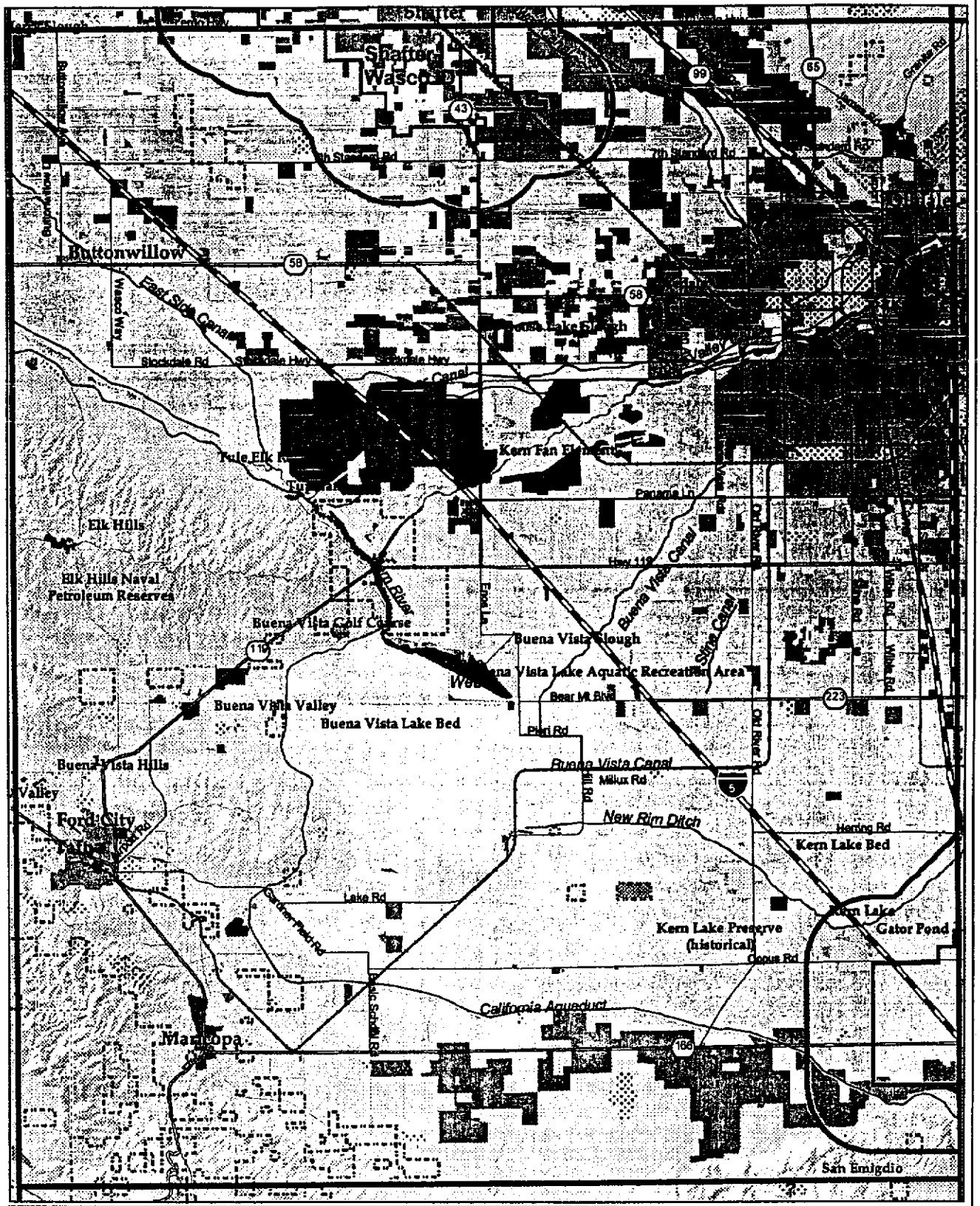
Taft

35119A1



Tejon Ranch

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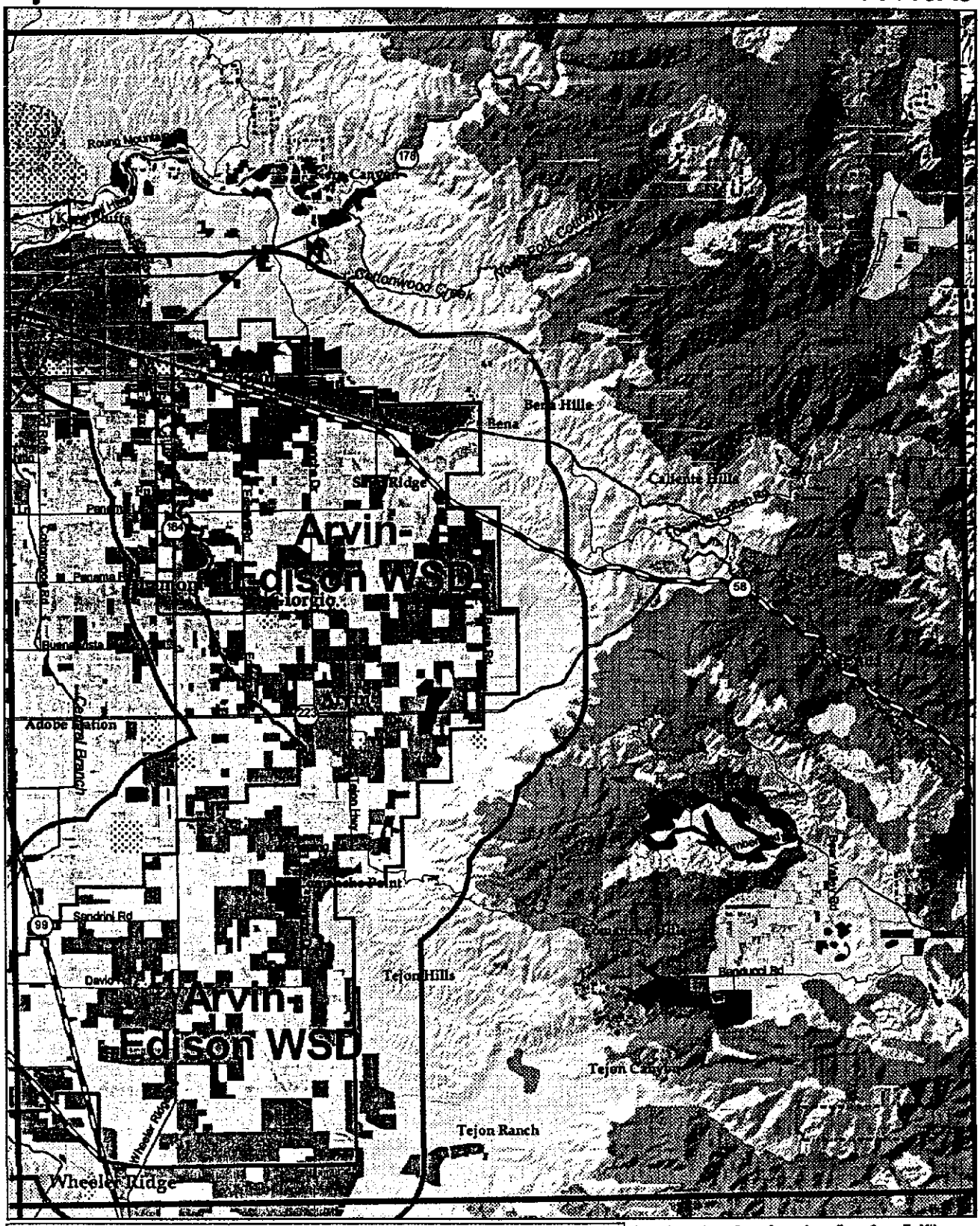

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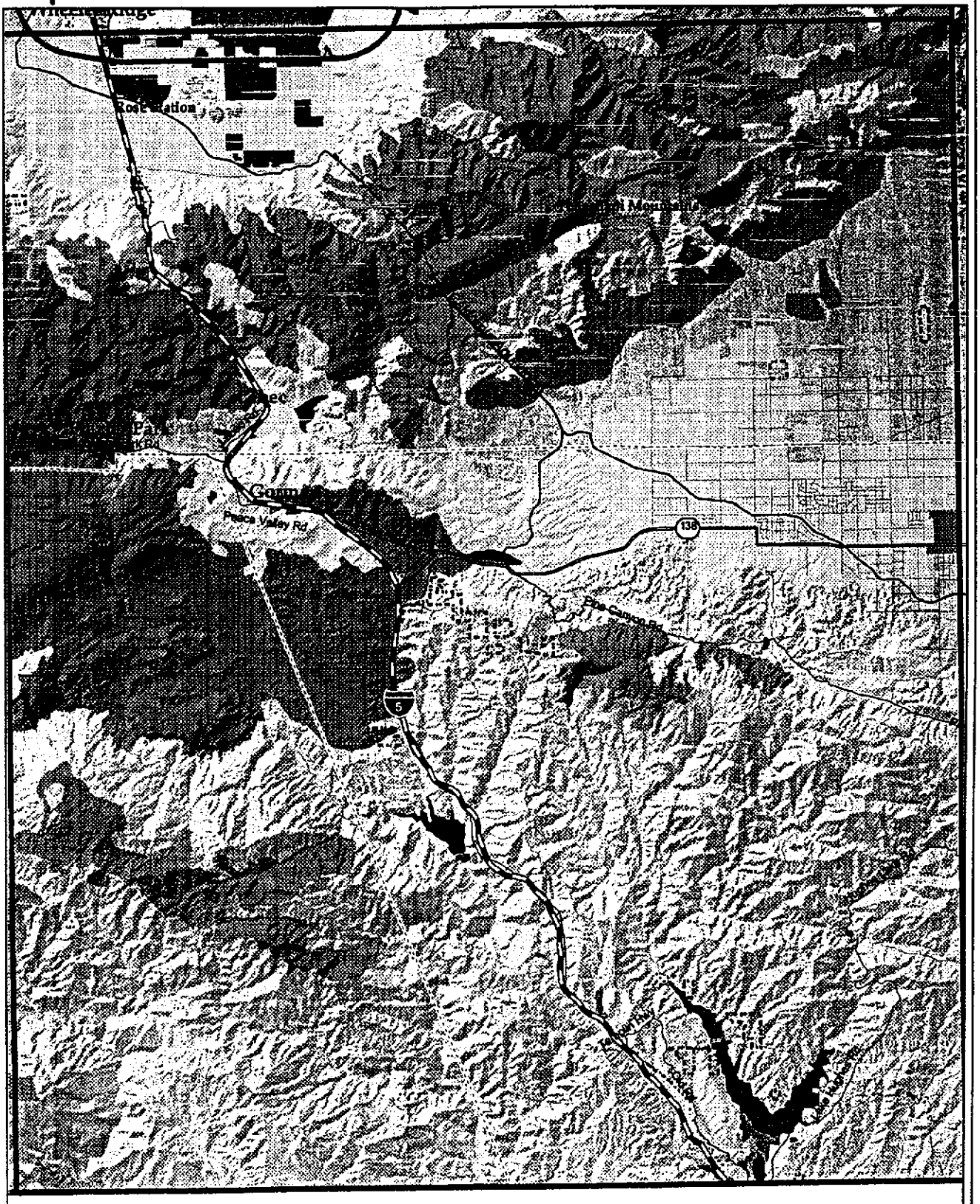
Grapevine

34118E5



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